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10/084,917	03/01/2002	Yang Wang	ASH01004	7131

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EXAMINER	
TSEGAYE, SABA	
ART UNIT	**PAPER NUMBER**
2467	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@verizon.com

Office Action Summary	Application No.	Applicant(s)	
	10/084,917	WANG, YANG	
	Examiner	Art Unit	
	SABA TSEGAYE	2467	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,8,9,16,23-26 and 28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *28* is/are allowed.

6)☒ Claim(s) *1,8,9,16 and 23-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed 12/22/09. Claims 1, 8, 9, 16, 23-26 and 28 are pending. Currently no claims are in condition for allowance.

Claim Rejections - 35 USC § 103

2. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alfieri et al. (US 2002/0099849) in view of Shafer (US 2002/019874 A1).

Regarding claim 8, Alfieri discloses a network point-of-presence comprising: a single physical router (14) having a plurality of resources including:

logic resources, including routing processes to determine routing for received packets and forwarding processes to forward the received packets to an appropriate destination (forwarding information, such as next hop routing information, MPLS label information, packet classification information, QoS information (0032, 0037)); and

physical resources (routing tables, communication links) comprising control resources including at least one routing table (each VAR 20 has its own routing table; the VBR 22 maintains a full BGP routing table (0023-0024, 0036)) and the data resources including physical specifications or the single physical router (as shown in fig. 4, a number of physical interfaces 50 connect to the access links 16 and 18 (ports). Examples of such interfaces include Ethernet interfaces, SONET interfaces etc.);

at least one backbone router (VBR 22) having a routing capacity (VBR 22 provides a tunneling service to plurality VARs 20) implemented, at an end-point of a high capacity network

link (VBR 22 is connected to the backbone links 18 of a wide area network 10 of Fig. 1), as a virtual router by the physical router system (14); and

at least one regional router (VAR 20), having a routing capacity that is below the routing capacity of the at least one backbone router (VBR 22, see Fig. 2) implemented as a virtual router by the physical router system (14), wherein the backbone virtual router (22) and the regional virtual router (20) share resources of the physical router system (see figs. 2-5; 0033-0036). Fig. 4 of Alfieri shows a high-level software and hardware organization for the router 14. Alfieri disclose that changes to underlying physical network (includes manual reconfiguration and automatic protection switching) result in the need to change routing tables and other data structures in the routing subsystem. However, Alfieri does not expressly disclose resources that modifiable by a user.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, such as **human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of a programmable resource to the routing system of Alfieri. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 9, Alfieri discloses the network POP further comprising: ports connecting the backbone virtual router to a high capacity transit network (fig. 2, backbone links 18); and ports connecting the regional router to a metropolitan area network (links 16).

3. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres (US 6,687,220) in view of Shafer (US 2002/0198974 A1).

Regarding claim 23, Ayres discloses a device-implemented router comprising: a device-implemented means for performing routing processes (VPN agent 36, QoS manger 38, LSP manger 40, interface 44 (see 0028-0029)); a device-implemented means for performing forwarding process (…the router 20 forwards the packet to respective internet server 38 and forwards the packet to an end user 24 [column 4, lines 28-40]….CPU 44 retrieves packets for ingress data queues…and forwards them to output queues…with respective output destinations…column 5, lines 39-44); a device-implemented means for implementing control resources (CPU 44); a device-implemented means for implementing data resources (Flow Mgr 54), including physical specifications of the device-implemented router (the respective packet flow rates of the ingress data queues associated with each VRI are independently adjusted); and a device-implemented means for implementing a plurality of virtual routers (VRI 50 and 52) that share selected ones of the means for performing routing processes, the means for implementing control resources and the means for implementing data resources (router 20; column 4, lines 28-40). Further, Ayres discloses, in Fig. 4, that a memory manager 53 monitors the ingress data queues 48 of the virtual routers 50 and 52 and increases or decreases the amount of memory, i.e., a router system resource, allocated to the ingress data queues. Ayres, also, suggests that the memory allocation adjustments are based on programmably modifiable factors such as QoS

factors and user profiles maintained by the service provider 22 (column 9, line 64-column 10, line 6).

Ayres does not expressly disclose that resources are user programmable.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities, such as **human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of user programmable resources to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

4. Claims 1 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres (US 6,687,220) in view of Alfieri et al. (US 2002/0099849) and Shafer (US 2002/0198974 A1).

Regarding claim 1, Ayres discloses, figs. 1-2, a device-implemented routing system (20) comprising: a plurality of device-implemented routing resources (CPU, routing domain, flow rates) including:

device-implemented logic resources (CPU; a communication interface 40 (DSPs)) including routing processes (a communication interface 40) to determine routing for received packets and

forwarding processes (the CPU selectively retrieves packets from the ingress data queues and forwards them) to forward the received packets to an appropriate destination; and

device-implemented physical resources (ingress data queue; flow rate; routing domain) comprising control resources (each VRI 50 and 52 have its own routing domain; ingress data queues 48 formed as linked lists in the DRAM 46 (shared)) and data resources (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59)), and data resources including physical specifications of the routing system (controlling the processing of data packets on an ingress data queue level is that the system resources of the router can be fairly distributed); and

a plurality of device-implemented virtual routers (VRIs 50 and 52) to configurably share the device-implemented routing resources (a single processing unit; a communication interface 40 (DSPs); DRAM). Ayres, further, discloses that the router 20 includes **a shared buffer memory 46** and each VRI 50 and 52 have its **own routing domain** (as in claim 26).

However, Ayres does not expressly disclose ***that the control resources including at least one routing table.***

Alfieri teaches several virtual access routers 20 and virtual backbone router 22 that are associated with respective customers. Each VAR 20 has its own routing table and runs its own instances of the routing protocol. The VBR 22 generally maintains a full BGP routing table. Further, Alfieri teaches that wide-area network 10 may employ routing protocols such as BGP, OSPF, RIP, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to add routing table, such as that suggested by Alfieri, to the VRI of Ayres in order to provide an efficient and reliable communication system.

Ayres discloses a plurality of a software configurable DSPs 42. Ayres also discloses a memory manager 53 that monitors the ingress data queues 48 of the virtual routers 50 and 52 and increases or decreases the amount of memory, i.e., a router system resource, allocated to the ingress data queues. The memory manger 53 operation suggests that the memory allocation adjustments are based on programmably modifiable factors such quality of service factors and user profiles maintained by the service provider 22 (column 9 and 10). In addition, Ayres discloses that the flow and memory mangers 54 and 53 constantly monitor the current operating conditions of the router 20 (e.g., processor and memory utilization). However, Ayres does not expressly disclose routing resources that are programmably modified by a user.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. Using a router management interface, the entities can make changes to the present router configuration and more efficiently manage router resources, policies and relation ships with other routers. The router management interface permits various entities, such as **human users and automated scripts, to configure the router** (page 1, 0004). Further, Shafer teaches a user may enter a command that automatically generated for script code based on a script configuration set by the user (0044).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of resources that are programmably modified by a user to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

Regarding claim 16, Ayres discloses a method comprising: allocating a first set of resources as shared resources (a communication interface 40 and a single control function (CPU), DRAM); allocating a second set or resources as non-shared resources, (each VRI have its own routing domain; flow manager 54 controls the packets flow rates), where the allocating the first set of resources and the allocating the second set of resources include:

allocating logic resources, including routing processes (CPU; a communication interface 40 (DSPs)) to determine routing for received packets and forwarding processes to forward the received packets to and appropriate destination (the CPU selectively retrieves packets from the ingress data queues and forwards them); and

allocating physical resources (ingress data queue; flow rate; routing domain) comprising control resources (each VRI 50 and 52 have its own routing domain; ingress data queues 48 formed as linked lists in the DRAM 46 (shared)) and data resources(the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; the system resources of the router 20 can be fairly distributed or restricted and individual user or VRI bandwidth guarantees (column 7, lines 29-59)), the data resources including physical specifications of the single device(controlling the processing of data packets on an ingress data queue level is that the system resources of the router can be fairly distributed); and

implementing a plurality of virtual routers (VRI 50 and 52) based on a reconfigurable sharing of resources from the first set of resources between the virtual routers (a single control function) and based on reconfigurably independently assigning resources of the second set of resources to the virtual router (the respective packet flow rates of the ingress data queues associated with the each VRI are independently adjusted; each VRI 50 and 52 have its own routing domain).

However, Ayres does not expressly disclose ***that the control resources including at least one routing table.***

Alfieri teaches several virtual access routers 20 and virtual backbone router 22 that are associated with respective customers. Each VAR 20 has its own routing table and runs its own instances of the routing protocol. The VBR 22 generally maintains a full BGP routing table. Further, Alfieri teaches that wide-area network 10 may employ routing protocols such as BGP, OSPF, RIP, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add routing table, such as that suggested by Alfieri, to the VRI of Ayres in order to provide an efficient and reliable communication system.

Ayres discloses a plurality of a software configurable DSPs 42. Ayres also discloses a memory manager 53 that monitors the ingress data queues 48 of the virtual routers 50 and 52 and increases or decreases the amount of memory, i.e., a router system resource, allocated to the ingress data queues. The memory manger 53 operation suggests that the memory allocation adjustments are based on programmably modifiable factors such quality of service factors and user profiles maintained by the service provider 22 (column 9 and 10). In addition, Ayres discloses that the flow and memory mangers 54 and 53 constantly monitor the current operating conditions of the router 20 (e.g., processor and memory utilization). However, Ayres does not expressly disclose routing resources that are programmably modified by a user.

Shafer teaches a router management interface that provides access to software modules and other resources residing on the router. The router management interface permits various entities**, such as human users and automated scripts, to configure the router**. Using the router management interface, the entities can make changes to the present router configuration

and more efficiently manage router resources, policies and relation ships with other routers (page 1, 0004).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the teachings from Shafer of user programmable resources to the routing system of Ayres. The benefit using programmable resource is that programs can be changed and upgraded and new futures are added easily than hardware changes.

5. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ayres in view of Shafer as applied to claims 1 and 23 above, and further in view of Alfieri.

Ayres in view of Shafer discloses all the claim limitations as stated above. Ayres, further, discloses that the router 20 includes **a shared buffer memory 46** and each VRI 50 and 52 have its **own routing domain** (as in claim 26). However, Ayres does not expressly disclose the control resources include at least one routing table.

Alfieri teaches several virtual access routers 20 and virtual backbone router 22 that are associated with respective customers. Each VAR 20 has its own routing table and runs its own instances of the routing protocol. The VBR 22 generally maintains a full BGP routing table. Further, Alfieri teaches that wide-area network 10 may employ routing protocols such as BGP, OSPF, RIP, etc. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add routing table, such as suggested by Alfieri, to the VRI of Ayres in view of Shafer in order to provide an efficient and reliable communication system.

Allowable Subject Matter

6. Claim 28 is allowed.

Response to Arguments

7. Applicant's arguments filed 12/22/09 have been fully considered but they are not persuasive. Applicant argues (Remarks, page 10) that Alfieri and Shafer do not disclose or suggest at least one regional router, having a routing capacity that is below the routing capacity of the at least one backbone router…" Examiner respectfully disagrees. Alfieri discloses, as shown in fig. 2, that each regional router 20 (VARs) are associated with respective customers and connected to the respective customers' access links 16. All regional routers 20 are connected to backbone router 22 and the backbone router is connected to the backbone links of the wide area routed network. The backbone router participated in the full routing of the wide-area routed network and maintains a full BGP routing table (0023). This shows that the backbone router has more capacity in order to serve each regional router 20.

Page 11, Applicant argues that "…Alfieri and Shafer do not disclose or suggest that "the backbone virtual router and the regional virtual router reconfigurably share resources of the single physical router based on a plurality of resource sharing configurations and an input by a user…" Examiner respectfully disagrees. Alfieri discloses virtual routers that share resources. Alfieri also shows, in fig. 4, a high-level software and hardware organization for a router 14. Further, Alfieri discloses (par. 0035) the desirability of programmably changing the configuration of shared router resources in a network router system. Also, Alfieri disclose that changes to underlying physical network (includes manual reconfiguration and automatic protection switching) result in the need to change routing tables and other data structures in the

routing subsystem. In addition Alfieri suggests that resources that are shared between routers are modifiable by a user. Further, Shafer assists by using a router management interface, human users and automated scripts can make changes to the present router **configuration and more efficiently mange router resources, policies and relation ships with other routers** (see 0004). In addition, Shafer teaches that routers maintain tables of routing information and exchange data and share resources.

Page 11, Applicant argues that "…Shafer does not disclose or suggest that the backbone virtual router and the regional virtual router reconfigurably share resources of the single physical router based on a plurality of resource sharing configurations and an input bay a user…" It is respectfully submitted that the rejection is based the combined teachings of Alfieri and Shafer references, and that the Alfieri reference, as pointed out above in the office action does teach this feature.

Page 14, Applicant argues that "…Examiner admits that Ayers does not disclose user programmable resources and relies on Par. 0004 of Shafer for allegedly disclosing this feature. Applicant submits that this alleged disclosure of Shafer does not disclose or suggest the features of amended claim 23." It is respectfully submitted that the rejection is based the combined teachings of Ayers and Shafer references, and that the Ayers reference, as pointed out above in the office action does teach this feature.

Page 15, Applicant argues that "…Shafer does not disclose or suggest a plurality of programmably modifiable sharing configurations that control how multiple virtual routers share resources…" It is respectfully submitted that the rejection is based the combined teachings of

Ayers and Shafer references, and that the Ayers reference, as pointed out above in the office action does teach this feature.

The Examiner also notes that similar arguments were presented regarding claims 1, 16 and 24-26 on pages 16 and 17. The examiner takes the same position.

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SABA TSEGAYE whose telephone number is (571)272-3091. The examiner can normally be reached on Monday-Friday (7:30-5:00), First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pankaj Kumar can be reached on (571) 272-3011. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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